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STR-NCP323X-EVK Test Report

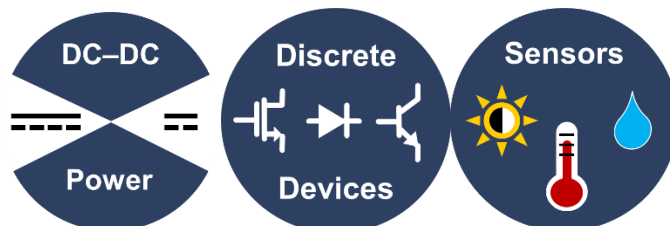


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Introduction

The STR-NCP323X-EVK allows users to evaluate the NCP3235, NCP3232N, and NCP3231 regulators with Strata's easy-to-use UI. The NCP3235/2N is a 15A, high efficiency voltage-mode buck converter which operates from 4.5V to 23V input, while the NCP3231 is a 30A buck converter that operates from 4.5V to 18V. All of these regulators operate at outputs as low as 0.6V. The primary difference between each controller are select features and current handling capabilities. They are similar in terms of regulation performance. Strata allows users to configure converter output voltage, operation mode (either FCCM or auto CCM/DCM at either 550Khz or 1Mhz), soft-start, and current limit. Strata also provides users with real-time measurements of input/output voltage and current, regulator efficiency, and controller temperature.

***Because each part is functionally similar, this test report only details the performance of the STR-NCP3235-EVK.**

Features

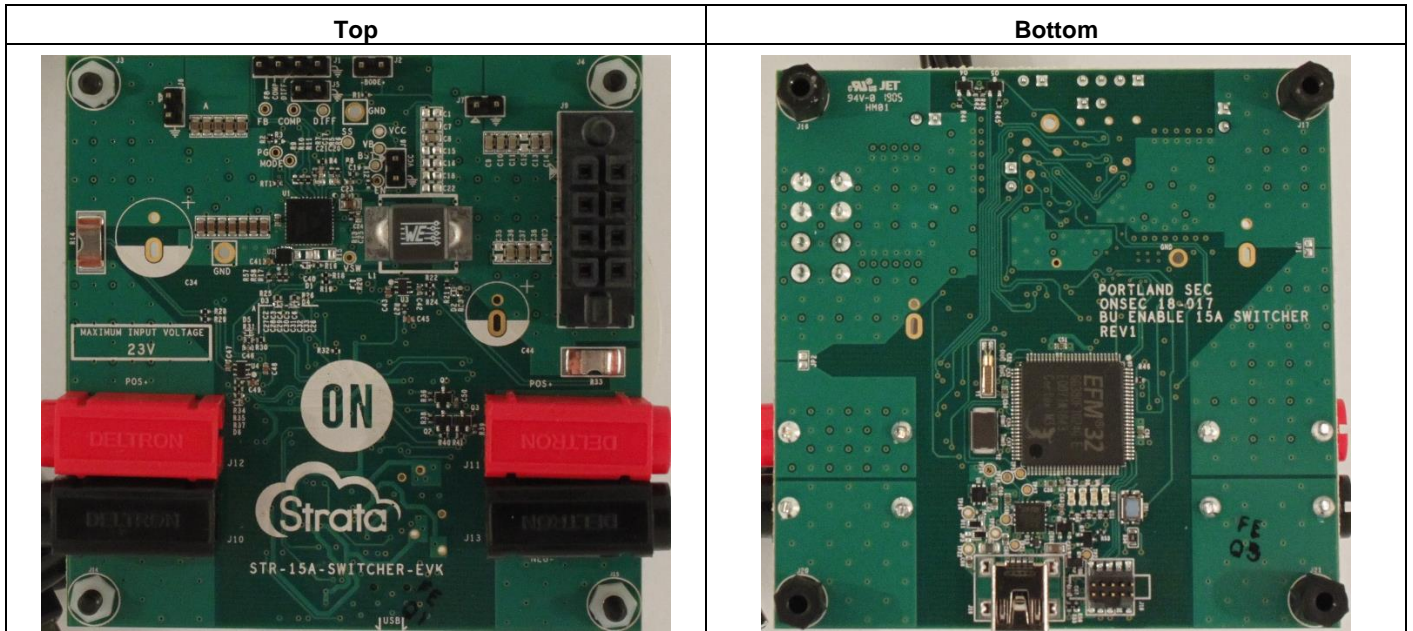
- Strata-enabled configurability and telemetry
- Switching Frequency Option: 550 kHz, 1.1 MHz
- External Programmable Soft-Start
- Lossless Low-side FET Current Sensing
- Output Over-voltage Protection and Under-voltage Protection
- Selective Hiccup/Latch Off Operation for All Faults
- Pre-bias Start-up
- Power Good Output
- Internal Over-temperature Protection
- Adjustable Input UVLO

Applications

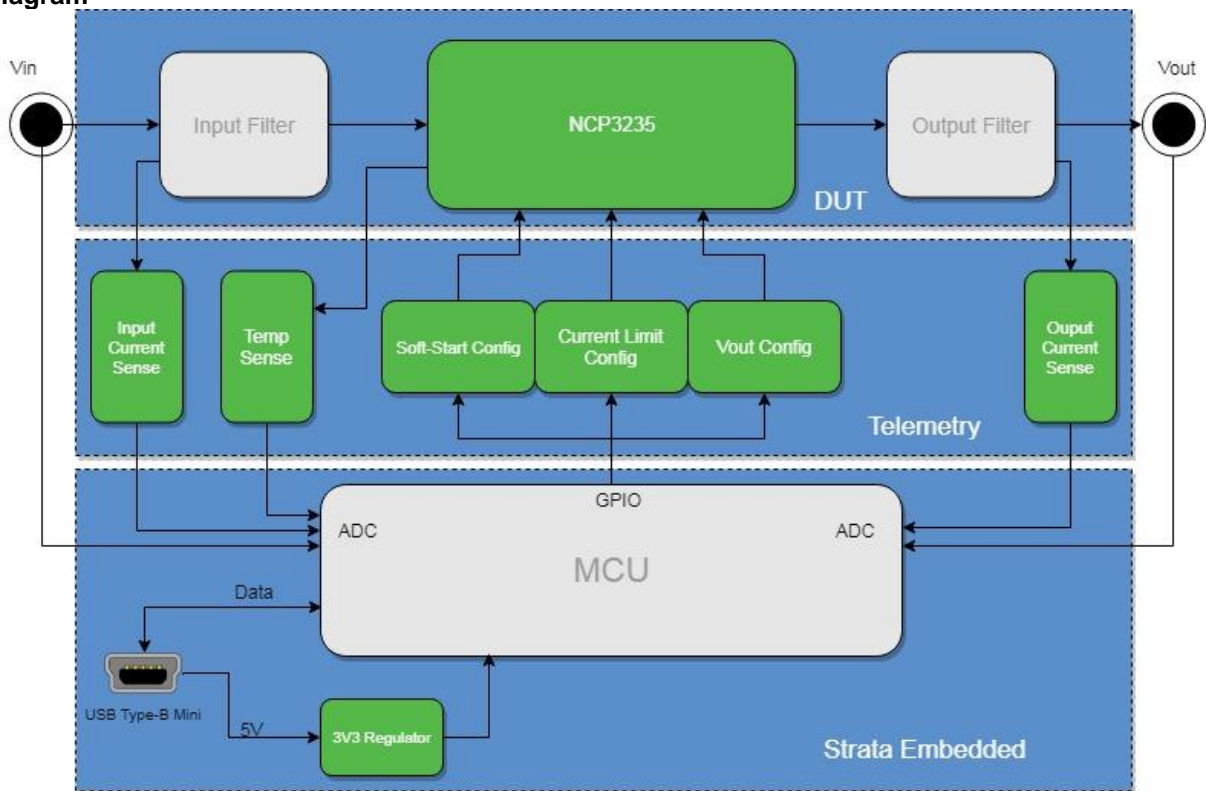
- Industry PC Equipment
- ASIC, FPGA, DSP and CPU Core and I/O Supplies
- Server and Storage System
- Telecom and Network Equipment

Comparison Between NCP3235, NCP3232N & NCP3231			
Feature	NCP3235	NCP3232N	NCP3231
Output Current	15A	15A	30A
Input Voltage Range	4.5V-23V	4.5V-23V	4.5V-23V
Thermal Shutdown	Internal Sense @ 150C	External Sense @ 150C	External Sense @ 150C
MODE Pin	Selectable Switching Modes	N/A (UVLO PIN instead)	N/A (UVLO Pin instead)

Board Picture



Block Diagram



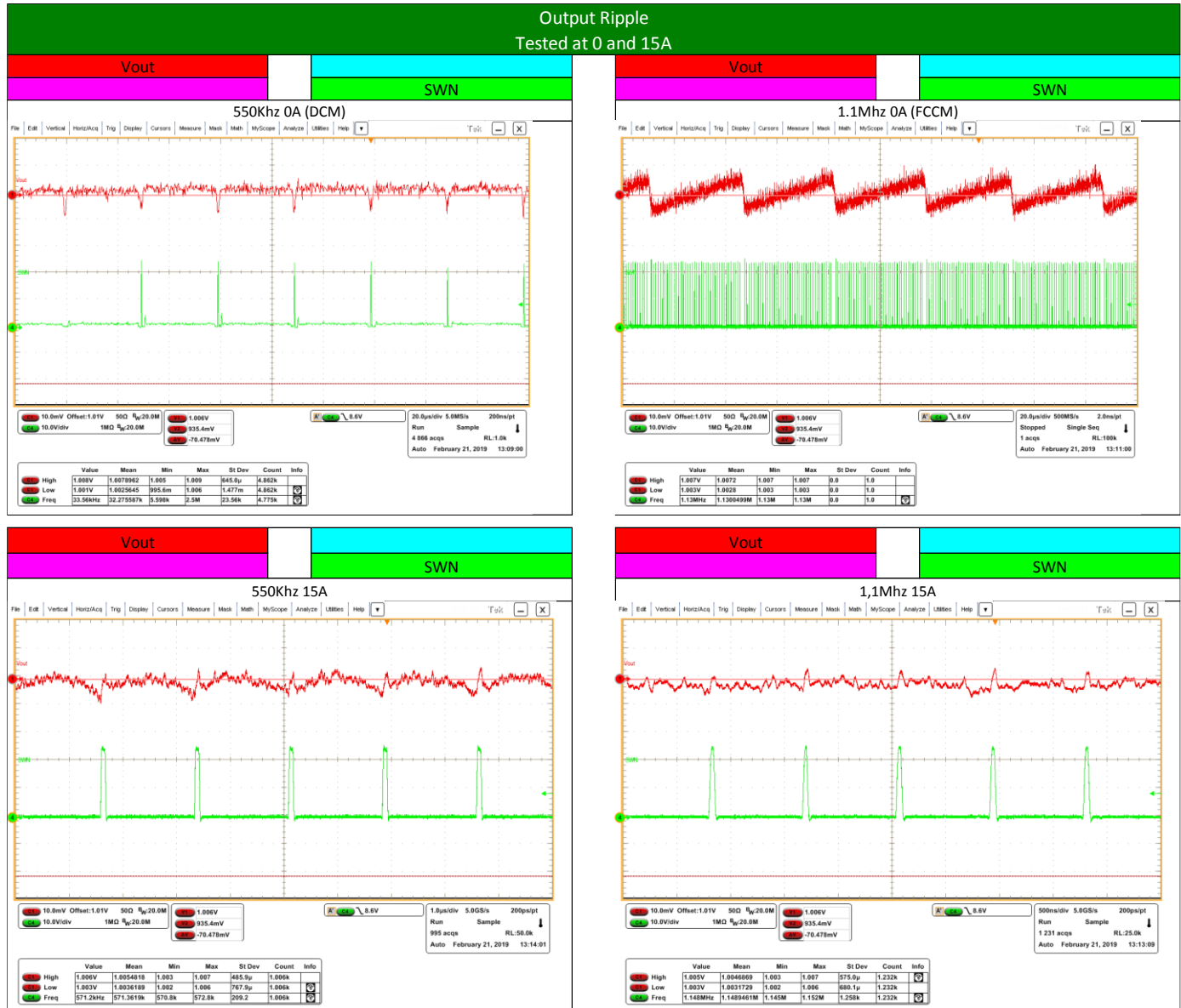
Validation

The following section displays validation measurements of critical regulator functions. Please note that the STR-NCP3235-EVK is designed to ensure stable performance throughout the NCP3235’s operating range. Further optimization is recommended for specific applications.

Ripple

Following oscilloscope captures display regulator performance with a constant output loading of 15A.

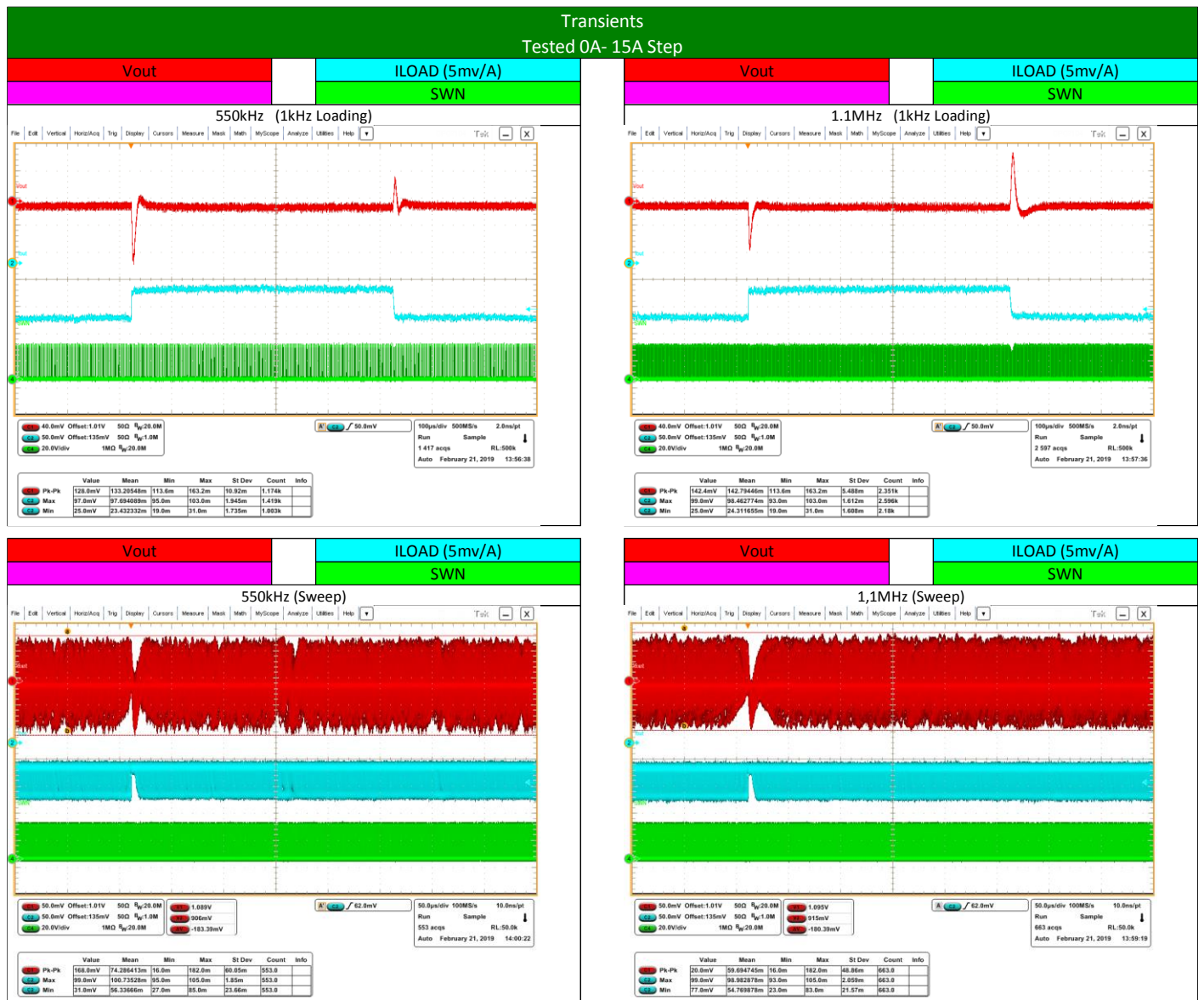
Test Conditions	
Input Voltage	23V
Output Voltage	1V
Lout	330nH
Cout	100µF
Load	0A & 15A
FSW	Variable (see below)



Transients

The following oscilloscope captures display regulator transient performance as the load is varied from 0A to 15A. Please note that the voltage measurement of the electronic load has a resolution of 5mV/A with a DC offset of 25mV.

Test Conditions	
Input Voltage	23V
Output Voltage	1V
Lout	330nH
Cout	100µF
Load Steps	0A to 15A
Slew Rate	10A/µs
Load Frequency	Variable (see below)
FSW	Variable (see below)



Soft Start-up

Displays Vout rise time with Strata-configured soft-start configurations. NCP3235 was in 1.1MHz FCCM for this test.

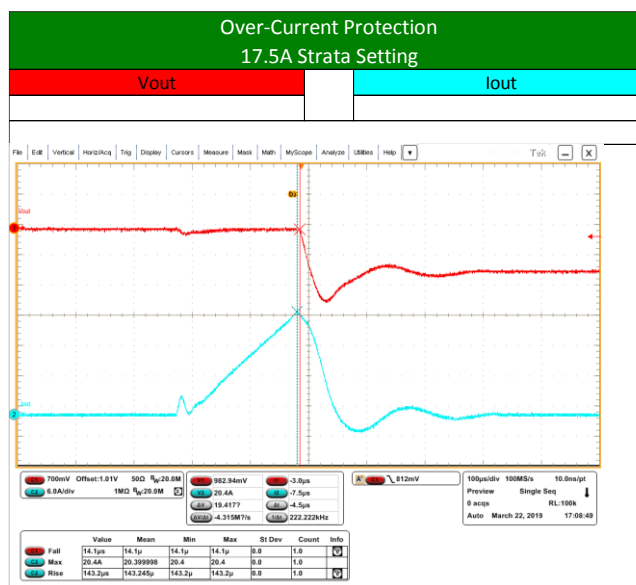


Over-current protection

The NCP3235 uses low-side current sensing for the over-current-protection. The following oscilloscope capture displays the OCP behavior when Strata has configured the OCP to trip at 17.5A continuous current. Please note that low-side sensing results in OCP tripping from inductor peak current, and many factors play a role in inductor current amplitude.

$$I_{ripple} = \frac{(V_{in}-V_{out}) * (\frac{V_{out}}{V_{in}})}{L_{out} * F_{sw}} \quad (1)$$

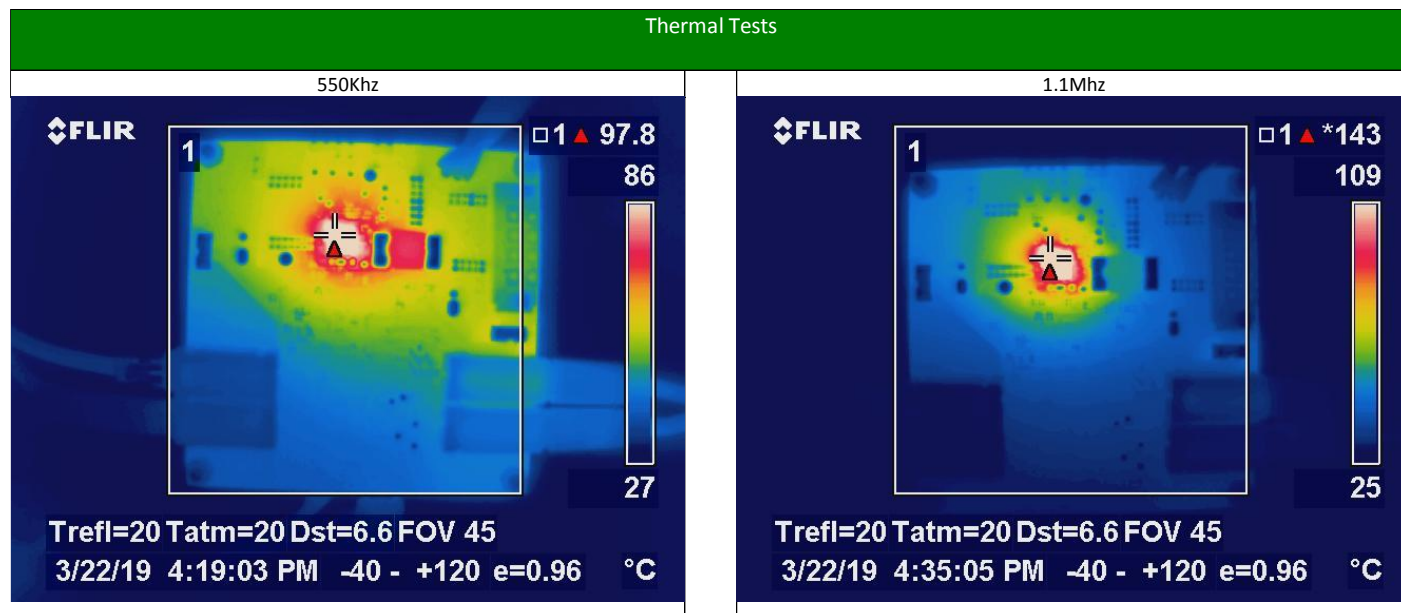
Test Conditions	
Input Voltage	23V
Output Voltage	1V
Lout	330nH
Fsw	1.1Mhz



Thermals

The following images display the thermal performance of the NCP3235 EVK. Please note that the EVK is not optimized for worst-case thermal scenarios, and will shut-off rather quickly due to internal over-temperature protection.

Test Conditions	
Input Voltage	23V
Output Voltage	1V
Iout	15A
Tsoak	2 Minutes



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